

## **The New Millennium Program: Validating Advanced Technologies for Future Space Missions**

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### **Abstract**

NASA's New Millennium Program was created to accelerate the insertion of advanced space-related technologies into future space missions using deep-space and earth-orbiting technology validation spacecraft. This paper describes objectives and current status of the New Millennium space exploration and earth orbiting missions and introduces the government/industry/academia Integrated Product Development Teams (IPDTs) and the microelectronics technologies they have developed for these validation missions.

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### **Summary**

The objective of the New Millennium Program (NMP) is to accelerate the insertion of advanced technologies into space missions of the 21<sup>st</sup> century, using both deep-space and earth-orbiting technology validation spacecraft. This validation program is an integral part of the NASA vision of space exploration based on miniature, low-cost and frequent scientific missions to explore the solar system as well as the earth environment.

The technology validation efforts of the NMP are focused around six technology thrust areas: (a) spacecraft autonomy, (b) telecommunications, (c) multifunctional and modular structures, (d) in-situ instrument and micro electromechanical systems, (e) instrument technologies and architecture, and (f) microelectronics systems. For each technology thrust area, teams (referred to as integrated product development teams or IPDTs) consisting of representatives from NASA and other government laboratories, industry and academia have been formed develop and provide the validation articles to be flown in the different space missions. The IPDTs function as government-industry-academia consortia and operate in a cooperative and collaborative fashion. IPDT membership is made up of representatives from 13 government agencies, 13 universities, 15 large corporations, and 10 small businesses.

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The papers presented in this session summarize the microelectronics related technologies that resulted from the efforts of three of the IPDTs. These technologies will be validated on the Deep Space 1 (DS-1), Deep Space 2 (DS-2), and Earth Orbiter 1 (EO-1) spacecraft which will be launched in October 1998, January 1999, and May 1999 respectively. The Deep Space 1 will demonstrate key technologies for long-duration deep-space missions. This spacecraft will fly by an asteroid and, in an extended mission, fly by comets Wilson-Harrington and Borielly. The Deep Space 2 will demonstrate key technologies which enable future network science missions and consists of 2 piggy-back probes on the Mars '98 Lander. The probes will autonomously enter the Mars atmosphere and penetrate the Mars surface upon impact and analyze subsurface soil samples for the presence of water. The Earth Orbiting 1 mission will fly in formation with the Landsat 7 spacecraft and validate technologies contributing to the reduction in cost of follow-on Landsat missions.

This paper will summarize the current New Millennium missions and the microelectronics technologies validated in each of the missions as well as introduce the non-NASA partners that have contributed to the success of these efforts. The infusion of these technologies into future NASA science missions will be discussed, and the other papers of this session will discuss the infusion of these technologies into the future products of NASA's New Millennium partners. Future technology validation missions in the New Millennium Program will also be described.